

=> file hca  
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FILE 'HCA' ENTERED AT 10:35:23 ON 24 JUL 2002

|     |        |   |
|-----|--------|---|
| L1  | 677    | SEA (SOLAR? OR SUNSHIN? OR SUN OR SUNS OR SUNNED OR<br>SUNNING#) (5A) (DISTILL? OR DIST# OR DISTN# OR CODISTILL?<br>OR CODIST# OR CODISTN#) |
| L2  | 5086   | SEA (ALUMINUM# OR ALUMINIUM# OR AL) (3A) INSULAT? OR<br>CELOTEX# OR THERMAX#  |
| L3  | 57850  | SEA BASIN? OR BOWL?   |
| L4  | 512788 | SEA CONTAINER? OR VESSEL? OR FLASK? OR RECEPTACL? OR<br>CHAMBER?  |
| L5  | 387097 | SEA LINER? OR LINING# OR LINED OR LINES OR INTERLIN?  |
| L6  | 614905 | SEA MEMBRAN?  |
| L7  | 817479 | SEA SILICON OR SI OR DOW OR CORNING   |
| L8  | 0      | SEA L1 AND L2   |
| L9  | 100    | SEA L1 AND L3   |
| L10 | 76     | SEA L1 AND L4   |
| L11 | 16     | SEA L1 AND L5   |
| L12 | 27     | SEA L1 AND L6   |
| L13 | 1      | SEA L1 AND L7   |
| L14 | 1      | SEA L9 AND L10  |
| L15 | 0      | SEA L9 AND L12  |
| L16 | 6      | SEA L10 AND L12   |
| L17 | 8      | SEA L13 OR L14 OR L16   |
| L18 | 15     | SEA L11 NOT L17   |
| L19 | 498    | S (SOLAR? OR SUNSHIN? OR SUN OR SUNS OR SUNNED OR SUNNING<br>0 S L19 AND L2   |
| L20 | 100    | S L19 AND L3  |
| L21 | 33     | S L19 AND L4  |
| L22 | 37     | S L19 AND L5  |
| L23 | 5      | S L19 AND L6  |
| L24 | 26     | S L19 AND L7  |
| L25 | 1      | S L21 AND L22   |
| L26 | 12     | S L21 AND L23   |
| L27 | 0      | S L21 AND L25   |
| L28 | 1      | S L22 AND L23   |
| L29 | 0      | S L22 AND L25   |
| L30 | 7      | S L23 AND L25   |
| L31 | 26     | S L24 OR L26 OR L27 OR L29 OR L31   |
| L32 | 13     | S L32 NOT (L17 OR L18)  |
| L33 |        |   |

=> d l17 1-8 cbib abs hitind

L17 ANSWER 1 OF 8 HCA COPYRIGHT 2002 ACS  
136:297608 Major element fractionation in chondrites by distillation in  
the accretion disk of a T Tauri Sun?. Hutchison, Robert (Mineralogy  
Department, The Natural History Museum, London, SW7 5BD, UK).  
Meteoritics & Planetary Science, 37(1), 113-124 (English) 2002.  
CODEN: MPSCFY. ISSN: 1086-9379. Publisher: Meteoritical Society.  
AB Redistribution or loss of batches of condensate from a cooling  
protosolar nebula is generally thought to have led to the formation  
of the chem. groups of chondrites. This demands a nebula hot enough  
for silicate vaporization over 1-3 AU, the region where chondrites  
formed. Alternatively, heating of a protosolar accretion disk may

have been confined to an annular zone at its inner edge, .apprx.0.06 AU from the protosun. Most infalling matter was accreted by the protosun, but a proportion was heated and carried outwards by an x-wind. Shu et al. (1996, 1997) proposed that larger objects such as chondrules and calcium-aluminum-rich inclusions (CAIs) were returned to the disk at asteroidal distances by sedimentation from the x-wind. Fine dust and gas were lost to space. The model implies that solids were not lost from the cold disk. The chem. compns. of the chondrite groups were produced by mixing different proportions of CAIs and chondrules with disk solids of CI compn. Heating at the inner edge of the disk was accompanied by particle irradiation, which synthesized nuclides including  $^{26}\text{Al}$ . The x-wind model can produce CAIs, not chondrules, and allows survival of presolar grains >0.06 AU from the protosun. Normalization to Al and CI indicates that non-carbonaceous chondrites may be disk material that gained a \*\*\*Si\*\*\* - and Mg-enriched fraction. Carbonaceous chondrites are different; they appear to be CI that lost lithophile elements more volatile than Ca. Five carbonaceous chondrite groups also lost Ni and Fe but the CH group gained siderophiles. Elemental loss from CI is incompatible with the x-wind model. \*\*\*Silicon\*\*\* and CI normalization confirms that the CM, CO, CK and CV groups may be CI that gained refractories as CAIs. The \*\*\*Si\*\*\* -, Mg-rich fraction may have formed by selective vaporization followed by pptn. on grains in the x-wind. This fractional distn. mechanism can account for lithophile element abundances in non-carbonaceous chondrite groups, but an addnl. process is required for the loss of Ca and Mn in the EL group and for fractionated siderophile abundances in the H, L and LL groups. Heated and recycled fractions were not homogenized across the disk so the chondrite groups were established in a single cycle of enhanced protosolar activity in <104 years, the time for a millimeter-sized particle to drift into the Sun from 2 to 3 AU, due to gas-drag.

CC 53-9 (Mineralogical and Geological Chemistry)  
IT Accretion, astrophysical  
Interplanetary dust

\*\*\*Solar\*\*\* nebula  
(fractional \*\*\*distn\*\*\* . model to explain origin of chondrite groups through a single cycle of enhanced activity of the protosun, representing a modified x-wind model)

IT \*\*\*Sun\*\*\*  
(proto-; fractional \*\*\*distn\*\*\* . model to explain origin of chondrite groups through a single cycle of enhanced activity of the protosun, representing a modified x-wind model)

L17 ANSWER 2 OF 8 HCA COPYRIGHT 2002 ACS

134:315589 Seawater desalination - SWCC experience and vision. Al-Sofi, Mohammad Abdul-Kareem (Research and Development Center (RDC), Saline Water Conversion Corporation (SWCC), Al-Jubail, 31951, Saudi Arabia). Desalination, 135(1-3), 121-139 (English) 2001. CODEN: DSLNAH. ISSN: 0011-9164. Publisher: Elsevier Science B.V..

AB A review, with no refs., is given on the history and development of seawater desalination. To appreciate Mankind's technol. advancements, one needs to present a historical overview. This applies to desalination technol. (among all other human developments). Over the millennia, desalination did develop very slowly at the start and then its development started to accelerate. The author has so far traced this technol. to as far back as to the 3rd millennium BC. Arabian Peninsula and its surroundings had been the cradle of this, like quite many other, fields of knowledge and technol. Such development has left its mark also around the

Mediterranean, esp. in Alexandria and Athens, then much later in Italy. The Arabian Islamic Civilization has engraved several thumbprints on the path of distn. An ingenious distiller with built-in internal reflux was found with Arabic writing below, to describe the device. Also, Demusquain glass was used in making lenses as \*\*\*solar\*\*\* heat concentrators for \*\*\*distn\*\*\*. During this millennium colonialism, which brought prosperity to some through exploitation of resources and the deprivation of the colonized masses, implemented desalination as one of its tools on board ships and within the so-called prosperous new found lands. With the increase of water demand and emphasis on desalination technol. due to shortage of underground resources in the kingdom, the government of Saudi Arabia established the Saline Water Conversion Corporation (SWCC) in 1974. Since then SWCC has grown and become the authority to look after all matters related to seawater desalination. At present SWCC has 27 plants producing 668 MGD of desalinated water and 4115 MW of electricity from existing operating plants. Addnl. four plants with a total capacity of 218 MGD of water and 999 MW of elec. power are under construction. This will take total desalinated water prodn. to 886 MGD and elec. power generation of 5114 MW. The last three decades have seen a tremendous growth of SWCC along a few different lines, such as: (a) enhanced prodn. capacity of desalinated water, (b) self administered operation and maintenance, (c) execution of trouble shooting and applied projects, (d) development of experience-based design concept, (e) venturing into new technol. and/or carry out modifications, into existing ones, (f) promote Saudization in all disciplines of desalination. With the immense interest and concern in developing seawater desalination industry to minimize cost, upgrade performance and prolong life of plants, a Research and Development Center (RDC) was established and inaugurated in 1987 to achieve these objectives. The center has five sections, Thermal, Reverse Osmosis, Corrosion, Chem., and Ecol. and Marine Biol. The center is equipped with most advanced and sophisticated equipment in addn. to a multistage flash (MSF) and several RO pilot plants. The RDC helps in solving problems in operating plants thus leading to higher efficiencies and longer plant life. RDC also helps in the selection of ideal materials and chems. for eventually achieving lower prodn. cost. Studies to protect the environment also were carried out. Since its inception the RDC has completed 117 projects in various aspects of desalination, some of which begot from problems encountered during plant operation. Also, SWCC Research and Development (R and D) and Studies and Designs (S and D) Departments are the corporate THINK TANKS for the future. SWCC activities have opened eyes into new horizons far behind the traditional ones. Lofty stands up high, as a new milestone which was brought into adaptation is nanofiltration of seawater as pretreatment, potentially for all desalination processes. Recent efforts at the center yielded a novel approach to \*\*\*membrane\*\*\* and thermal seawater desalination processes using nanofiltration (NF) \*\*\*membrane\*\*\*. This patented concept of using NF as pretreatment to both RO and MSF processes enhances the prodn. of desalted water by >60% and reduces the cost by .apprx.30%, yet it is an environmentally friendly process. Preliminary results of studies on NF indicate that this new concept could one day revolutionize desalination technol. Other prospective horizons are by conducting applied research on: (a) design, commissioning then operation of large capacity distillers, (b) hybridization of desalination processes, (c) exploration of alternative energy sources for desalination, e.g., solar and nuclear, (d) search for suitable and

cost effective chems., alloys and synthetic materials, (e) new design for very large no. \*\*\*membrane\*\*\* elements housing (the proposed \*\*\*vessel\*\*\* is envisioned to be like a heat exchanger and/or a steam drum), (f) designing, building and testing elevated top brine temp. (TBT) MSF process at (and/or above) 160.degree., (g) treatment and safe disposal of waste generated through better understanding of environment interactive impacts related to desalination, (h) magnetically enhanced sepn. of seawater hardness.

CC 61-0 (Water)  
Section cross-reference(s): 20

L17 ANSWER 3 OF 8 HCA COPYRIGHT 2002 ACS  
128:312667 Solar stills for producing fresh water. Domen, Jean-Paul (Domen, Jean-Paul, Fr.). PCT Int. Appl. WO 9816474 A1 19980423, 38 pp. DESIGNATED STATES: W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG. (French). CODEN: PIXXD2. APPLICATION: WO 1997-FR1855 19971016. PRIORITY: FR 1996-12614 19961016; FR 1997-7315 19970613.

AB The app. has a long cylindrical shape, inflated with air under slight excess pressure, comprising: an evapg. \*\*\*chamber\*\*\*, a first condensing \*\*\*chamber\*\*\* and a second condensing \*\*\*chamber\*\*\*; the evapg. \*\*\*chamber\*\*\* is provided with a thermal insulating transparent cover and its external wall is made up of a black impermeable \*\*\*membrane\*\*\*, internally coated with a hydrophilic nap; the first condensing \*\*\*chamber\*\*\* has an impermeable wall and is sepd. from the evapg. \*\*\*chamber\*\*\* by a dividing partition, coated with a hydrophilic nap of this \*\*\*chamber\*\*\*; the second condensing \*\*\*chamber\*\*\* communicates with the two preceding ones and its wall which comprises an impermeable \*\*\*membrane\*\*\* and an external hydrophilic nap, exposed to the open air and kept wet by a permanent supply of water; a ventilating fan blows air in close circuit in the three \*\*\*chambers\*\*\* and assocd. means maintain excess pressure therein; the fresh water is collected at a lower point of the second condensation \*\*\*chamber\*\*\* and the brine at a lower point of the evapn. \*\*\*chamber\*\*\*. The invention is useful for economical prodn. of fresh water in dry regions.

IC ICM C02F001-14

CC 61-4 (Water)

IT \*\*\*Distillation\*\*\* apparatus  
\*\*\*Membranes\*\*\*, nonbiological

Solar energy

( \*\*\*solar\*\*\* stills for producing fresh water)  
IT 9002-88-4, Polyethylene 9004-34-6, Cellulose, uses  
( \*\*\*membrane\*\*\*; solar stills for producing fresh water)

L17 ANSWER 4 OF 8 HCA COPYRIGHT 2002 ACS  
123:349758 Distillation apparatus for desalination of seawater utilizing solar energy. Takayama, Motohiro (Takayama Motohiro, Japan). Jpn. Kokai Tokkyo Koho JP 07251036 A2 19951003 Heisei, 3 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1994-43607 19940315.

AB The title app. comprises a \*\*\*vessel\*\*\* for accommodating a soln. (e.g., seawater), a heat-transmitting cover on its upper opening for transmission of heat from solar ray, a gas-liq. sepn. \*\*\*membrane\*\*\* arranged on the lower opening of the \*\*\*vessel\*\*\*.

for permeating vaporized solvent vapor (e.g., water vapor) only, and a pan below the \*\*\*membrane\*\*\* for receiving distd. liq. (distd. water). The app. is mainly used for desalination of seawater.

IC ICM B01D061-36  
ICS B01D001-00; B01D003-00; C02F001-04; C02F001-14  
CC 61-4 (Water)  
Section cross-reference(s): 47  
ST distn app seawater desalination; \*\*\*solar\*\*\* energy  
\*\*\*distn\*\*\* app seawater; water purifn desalination distn app  
IT Distillation apparatus  
\*\*\*Membranes\*\*\*  
Waters, ocean  
(distn. app. for desalination of seawater utilizing solar energy)  
IT Water purification  
( \*\*\*distn\*\*\* , \*\*\*solar\*\*\* , app., \*\*\*distn\*\*\* . app.  
for desalination of seawater utilizing solar energy)

L17 ANSWER 5 OF 8 HCA COPYRIGHT 2002 ACS  
112:202135 Distillation apparatus for liquids. Heinzl, Volker;  
Holzinger, Juergen; Albrecht, Stefan (Kernforschungszentrum  
Karlsruhe G.m.b.H., Fed. Rep. Ger.). Ger. Offen. DE 3819124 A1  
19891214, 5 pp. (German). CODEN: GWXXBX. APPLICATION: DE  
1988-3819124 19880604.

AB The app. with variable energy supply such as solar energy-heated  
vapor or liqs. comprises a distn. \*\*\*vessel\*\*\* , which is heated  
by an energy carrier, and a superposed condensation top  
\*\*\*vessel\*\*\* with a bottom condensate reservoir. The reservoir  
has a downwardly directed outlet, which leads into a transversal  
line. The transversal line is divided into a branch leading into an  
air collecting \*\*\*vessel\*\*\* and a branch leading into an  
elastically deformable tightly sealed condensate \*\*\*membrane\*\*\*  
\*\*\*vessel\*\*\* , which is contained in a raw water \*\*\*container\*\*\*  
. The raw water \*\*\*container\*\*\* is connected with the distn.  
\*\*\*vessel\*\*\* . The liq. level in the line leading to the  
\*\*\*membrane\*\*\* \*\*\*vessel\*\*\* is higher than the liq. level in  
the distn. \*\*\*vessel\*\*\* and provides a pressure on the liq. in  
the raw water \*\*\*container\*\*\* .

IC ICM B01D003-00  
ICS B01D001-00; B01D005-00; C02F001-14; C02F001-16  
CC 52-3 (Electrochemical, Radiational, and Thermal Energy Technology)  
ST \*\*\*distn\*\*\* app \*\*\*solar\*\*\*  
IT \*\*\*Distillation\*\*\* apparatus  
( \*\*\*solar\*\*\* , structure of)

L17 ANSWER 6 OF 8 HCA COPYRIGHT 2002 ACS  
105:136067 Portable floating \*\*\*solar\*\*\* \*\*\*distilling\*\*\*  
apparatus. Novikov, P. A.; Snezhko, E. K.; Novikova, V. I.;  
Malyarchikov, A. D.; Lebedev, G. S.; Zubilov, V. S.; Telepov, S. V.  
(Institute of Heat and Mass Transfer Academy of Sciences,  
Belorussian S.S.R., USSR). U.S.S.R. SU 1244098 A1 19860715 From:  
Otkrytiya, Izobret. 1986, (26), 96-7. (Russian). CODEN: URXXAF.  
APPLICATION: SU 1983-3707444 19831219.

AB The distn. unit contains an inflatable \*\*\*container\*\*\* made in  
the form of shells from a transparent polymer \*\*\*membrane\*\*\*  
with conical walls and a bottom, a vaporizing element enclosed in  
the \*\*\*container\*\*\* , a reservoir for the distg. liq., a ballast  
tank, distillate collectors, hydraulic valves, and a supply tank.  
In order to improve the operating reliability by eliminating the  
possibility of mixing of distillate with the distg. liq., the  
reservoir lid and the ballast tank are provided with protection

shields under which is located the heating element. The protective shield of the reservoir is equipped with an addnl. heater. The distn. unit is also equipped with a drain pipe.

IC ICM C02F001-14  
CC 47-2 (Apparatus and Plant Equipment)  
Section cross-reference(s): 52, 61  
ST \*\*\*distn\*\*\* \*\*\*solar\*\*\* app portable  
IT \*\*\*Distillation\*\*\* apparatus  
( \*\*\*solar\*\*\* , portable, design of)

L17 ANSWER 7 OF 8 HCA COPYRIGHT 2002 ACS

71:6444 New concepts for desalting brackish water. Homer, William A. (Bechtel Corp., Vernon, Calif., USA). J. Amer. Water Works Ass., 60(8), 869-81 (English) 1968. CODEN: JAWWA5.

AB Desalting processes available for com. use are discussed. Included are multflash distn., multiple-effect \*\*\*distn\*\*\* ., vapor compression \*\*\*distn\*\*\* ., \*\*\*solar\*\*\* \*\*\*distn\*\*\* ., \*\*\*membrane\*\*\* processes, electrodialysis, reverse osmosis, and ion-exchange. New processes given are: (1) use of a high capacity weakly basic resin, IRA-68, which is highly selective for bicarbonate-mineral acidity and can, therefore, convert salts in saline water to bicarbonate form, which is used as the first unit in a series; a 2nd ion-exchange unit contains IRA-84, a weak acidic cation resin with a high capacity for cations in the bicarbonate form; (2) the Sul-bi Sul Process, which uses a special anion resin, and promises economical treatment for brackish waters; the effluent from a conventional cation exchanger is passed through a unit contg. a strongly basic anion resin operated on a sulfate-bisulfate cycle; (3) freezing-compression, which utilizes flash evapn. at a low temp. of a precooled feed water to chill and freeze a portion of the water; vapor from the flash \*\*\*chamber\*\*\* is compressed so that it will condense and melt the previously sepd. ice in the melter; (4) direct contact freezing, which is a dual fluid process using a hydrocarbon refrigerant as a secondary fluid to reduce the size of vapor handling equipment; (5) hydrate formation, which causes a hydrocarbon (propane), to come into direct contact with the feed water at a low temp. to form a solid hydrate; after melting, the hydrocarbon is sepd. from water by decantation. Applications and approx. costs for each process are given.

CC 61 (Water)  
ST desalting brackish waters; brackish waters desalting; distn brackish waters; \*\*\*solar\*\*\* \*\*\*distn\*\*\* brackish waters; ion exchange brackish waters; electrodialysis brackish waters; reverse osmosis brackish waters

L17 ANSWER 8 OF 8 HCA COPYRIGHT 2002 ACS

61:30230 Original Reference No. 61:5223a-b \*\*\*Solar\*\*\*  
\*\*\*distillation\*\*\* in natural bodies of water. Muller, John G. US 3138546 19640623, 7 pp. (Unavailable). APPLICATION: US 19580502.

AB Solar energy is utilized for demineralizing water from a naturally occurring shallow \*\*\*basin\*\*\* more economically than in closed \*\*\*containers\*\*\* by providing an evapn. barrier to retain heat and a dye to increase absorption. Heated water is drawn through a floating intake strainer and pumped to a flash \*\*\*chamber\*\*\* from which vapors pass into a condenser for recovery. Naphthol Green B at a concn. of 3 p.p.m. is the dye used to absorb infrared rays. The unimol. evapn. barrier consists of hexadecanol contg. a small amt. of stearyl alc. A distribution rate of 15 lb. of hexadecanol flakes/acre reduces the surface tension from 42 dynes/cm. for clean water down to 10 dynes/cm.

NCL 202205000  
CC 16 (Apparatus, Plant Equipment, and Unit Operations and Processes)

=> d 133 1-13 cbib abs hitind

L33 ANSWER 1 OF 13 HCA COPYRIGHT 2002 ACS  
136:139473 Exploitation of solar energy collected by \*\*\*solar\*\*\*  
\*\*\*stills\*\*\* for desalination by \*\*\*membrane\*\*\* distillation.  
Banat, F.; Jumah, R.; Garaibeh, M. (Department of Chemical  
Engineering, Jordan University of Science and Technology, Irbid,  
22110, Jordan). Renewable Energy, Volume Date 2002, 25(2), 293-305  
(English) 2001. CODEN: RNE3. ISSN: 0960-1481. Publisher:  
Elsevier Science Ltd..

AB The aim was to evaluate the feasibility of producing potable water  
from simulated seawater by integrating a \*\*\*membrane\*\*\* distn.  
module with a \*\*\*solar\*\*\* \*\*\*still\*\*\*. The relatively hot  
brine in the \*\*\*solar\*\*\* \*\*\*still\*\*\* was used as a feed to  
the \*\*\*membrane\*\*\* module. The synergistic action of the  
\*\*\*solar\*\*\* \*\*\*still\*\*\* and the \*\*\*membrane\*\*\* module in  
the prodn. of potable water was quantified. Two types of expt. were  
conducted, indoor expts. and outdoor expts. The sensitivity of the  
permeate flux to the brine temp., flow rate, salt concn. and solar  
irradn. were studied. Overall, the flux of water from the  
\*\*\*solar\*\*\* \*\*\*still\*\*\* was  $\approx 20\%$  of the total flux.  
The brine temp. significantly affected the flux of both the  
\*\*\*solar\*\*\* \*\*\*still\*\*\* and the \*\*\*membrane\*\*\* module,  
while the effect of salt concn. was marginal. The effect of these  
process parameters was more noticeable in the \*\*\*membrane\*\*\*  
module than in the \*\*\*solar\*\*\* \*\*\*still\*\*\*.

CC 61-4 (Water)

Section cross-reference(s): 52

ST \*\*\*solar\*\*\* energy \*\*\*still\*\*\* desalination \*\*\*membrane\*\*\*  
distn

IT Water purification  
(desalination; solar energy collected by \*\*\*solar\*\*\*  
\*\*\*stills\*\*\* for desalination by \*\*\*membrane\*\*\* distn.)

IT Water purification  
(distn., solar; solar energy collected by \*\*\*solar\*\*\*  
\*\*\*stills\*\*\* for desalination by \*\*\*membrane\*\*\* distn.)

IT Water purification  
( \*\*\*membrane\*\*\* sepn.; solar energy collected by  
\*\*\*solar\*\*\* \*\*\*stills\*\*\* for desalination by  
\*\*\*membrane\*\*\* distn.)

L33 ANSWER 2 OF 13 HCA COPYRIGHT 2002 ACS  
136:126022 Chemical abundances of OB stars with high projected  
rotational velocities. Daflon, Simone; Cunha, Katia; Butler, Keith;  
Smith, Verne V. (Observatorio Nacional, Rio de Janeiro, 20921-400,  
Brazil). Astrophysical Journal, 563(1, Pt. 1), 325-333 (English)  
2001. CODEN: ASJOAB. ISSN: 0004-637X. Publisher: University of  
Chicago Press.

AB Elemental abundances of carbon, nitrogen, oxygen, magnesium,  
aluminum, and \*\*\*silicon\*\*\* are presented for a sample of 12  
rapidly rotating OB star ( $v \sin i > 60 \text{ km s}^{-1}$ ) members of the Cep  
OB2, Cyg OB3, and Cyg OB7 assocns. The abundances are derived from  
spectrum synthesis, using both LTE and non-LTE calcns. As found in  
almost all previous studies of OB stars, the av. abundances are  
slightly below solar, by about 0.1 to 0.3 dex. In the case of  
oxygen, even with the recently derived low solar abundances, the OB  
stars are closer to, but \*\*\*still\*\*\* below, the \*\*\*solar\*\*\*

value. Results for the nine Cep OB2 members in this sample can be combined with results published previously for eight Cep OB2 stars with low projected rotational velocities to yield the most complete set of abundances, to date, for this particular assocn. These abundances provide a clear picture of both the general chem. and individual stellar evolution that has occurred within this assocn. By placing the Cep OB2 stars studied in an HR-diagram we identify the presence of two distinct age subgroups, with both subgroups having quite uniform chem. abundances. Two stars are found in the older subgroup that show significant N/O overabundances, with both stars being two of the most massive, the most evolved, and the most rapidly rotating of the members studied in Cep OB2. These characteristics of increased N abundances being tied to high mass, rapid rotation, and an evolved phase are those predicted from models of rotating stars that undergo rotationally driven mixing.

CC 73-9 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

IT 7429-90-5, Aluminum, occurrence 7439-95-4, Magnesium, occurrence 7440-21-3, \*\*\*Silicon\*\*\*, occurrence 7440-44-0, Carbon, occurrence 7727-37-9, Nitrogen, occurrence 7782-44-7, Oxygen, occurrence

(chem. abundances of OB stars with high projected rotational velocities)

IT 14127-58-3, Sulfur 2+, occurrence 14127-63-0, Oxygen2+, occurrence 14158-23-7, Nitrogen1+, occurrence 14175-55-4, Silicon2+, occurrence 14175-56-5, Silicon3+, occurrence 14581-92-1, Magnesium1+, occurrence 14581-93-2, Oxygen1+, occurrence 14701-12-3, Sulfur1+, occurrence 14782-23-1, Neon1+, occurrence 15724-40-0, Aluminum2+, occurrence 16092-61-8, Carbon2+, occurrence 17439-59-7, occurrence

(chem. abundances of OB stars with high projected rotational velocities studied via \*\*\*lines\*\*\* of)

L33 ANSWER 3 OF 13 HCA COPYRIGHT 2002 ACS

135:310410 Chemical abundances of OB stars with high projected rotational velocities. Daflon, Simone; Cunha, Katia; Butler, Keith; Smith, Verne V. (Observatorio Nacional, Rua General Jose Cristino 77, Rio de Janeiro, CEP 20921-400, Brazil). Los Alamos National Laboratory, Preprint Archive, Astrophysics 1-25, arXiv:astro-ph/0108395 (English) 24 Aug 2001. CODEN: LNASFZ. URL: <http://xxx.lanl.gov/pdf/astro-ph/0108395> Publisher: Los Alamos National Laboratory.

AB Elemental abundances of C, N, O, Mg, Al, and \*\*\*Si\*\*\* are presented for a sample of 12 rapidly rotating OB star ( $v \sin i > 60$  kms-1) members of the Cep OB2, Cyg OB3 and Cyg OB7 assocns. The abundances are derived from spectrum synthesis, using both LTE and non-LTE calcns. As found in almost all previous studies of OB stars, the av. abundances are slightly below solar, by .apprxq.0.1-0.3 dex. In the case of O, even with the recently derived low solar abundances the OB stars are closer to, but \*\*\*still\*\*\* below, the \*\*\*solar\*\*\* value. Results for the 9 Cep OB2 members in this sample can be combined with results published previously for 8 Cep OB2 stars with low projected rotational velocities to yield the most complete set of abundances, to date, for this particular assocn. These abundances provide a clear picture of both the general chem. and individual stellar evolution that has occurred within this assocn. By placing the Cep OB2 stars studied in an HR diagram we identify the presence of two distinct age subgroups, with both subgroups having quite uniform chem. abundances. Two stars are found in the older subgroup that



show significant N/O overabundances, with both stars being two of the most massive, the most evolved, and most rapidly rotating of the members studied in Cep OB2. These characteristics of increased N abundances being tied to high mass, rapid rotation, and an evolved phase are those predicted from models of rotating stars which undergo rotationally driven mixing.

CC 73-9 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

IT 7429-90-5, Aluminum, occurrence 7439-95-4, Magnesium, occurrence 7440-21-3, \*\*\*Silicon\*\*\*, occurrence 7440-44-0, Carbon, occurrence 7727-37-9, Nitrogen, occurrence 7782-44-7, Oxygen, occurrence

(chem. abundances of OB stars with high projected rotational velocities)

IT 14127-63-0, Oxygen2+, occurrence 14158-23-7, Nitrogen1+, occurrence 14175-55-4, Silicon2+, occurrence 14175-56-5, Silicon3+, occurrence 14581-92-1, Magnesium1+, occurrence 14581-93-2, Oxygen1+, occurrence 14701-12-3, Sulfur1+, occurrence 14782-23-1, Neon1+, occurrence 15724-40-0, Aluminum2+, occurrence ~~16092-61-8, Carbon2+, occurrence 17439-59-7, occurrence~~

(chem. abundances of OB stars with high projected rotational velocities studied via \*\*\*lines\*\*\* of)

L33 ANSWER 4 OF 13 HCA COPYRIGHT 2002 ACS

130:358913 Light element non-LTE abundances of .lambda. Bootis stars. Part 1. Carbon and oxygen. Paunzen, E.; Kamp, I.; Iliev, I. Kh.; Heiter, U.; Hempel, M.; Weiss, W. W.; Barzova, I. S.; Kerber, F.; Mittermayer, P. (Institut Astronomie, Univ. Wien, Vienna, A-1180, Austria). Astronomy and Astrophysics, 345(2), 597-604 (English) 1999. CODEN: AAEJAF. ISSN: 0004-6361. Publisher: Springer-Verlag.

AB Abundances for the light elements of .lambda. Bootis stars are a main key to understand the astrophys. processes behind the so-called .lambda. Bootis phenomenon. These stars are characterized by a typical abundance pattern (strong underabundances of the Fe-peak elements whereas the light elements have apparently \*\*\*solar\*\*\* abundances) which is \*\*\*still\*\*\* based mainly on LTE calcns. Therefore we started an investigation to derive accurate abundances of the light elements (C, N, O, and S). For this purpose a new O model atom was implemented in the Kiel non-LTE code. High-resoln. and high signal-to-noise spectra were used. For each element only a single wavelength region with \*\*\*lines\*\*\* of the specific element was selected and obsd. to avoid contamination from other elements. In the 1st paper we present abundances for C and O of a statistically significant no. of well established .lambda. Bootis stars. The 2nd paper will deal with N and S. The most important result is that on av. C is less abundant than O but still both elements are significant more abundant than the Fe-peak elements. Furthermore the anticorrelation of C and O with the \*\*\*Si\*\*\* abundance is proven, which strongly supports the accretion/diffusion theory.

CC 73-9 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

L33 ANSWER 5 OF 13 HCA COPYRIGHT 2002 ACS

125:15113 A dialytic battery with ion-exchange \*\*\*membranes\*\*\*. Dependence of the power output on the concentration of saline water. Suda, Fujio; Konno, Miwa; Sawabe, Izumi; Yamaguchi, Yuriko (Sch. Humanities Culture, Tokai Univ., Hiratsuka, 259-12, Japan). J. Adv. Sci., 7(3&4), 182-187 (Japanese) 1995. CODEN: JAVSEQ. ISSN: 0915-5651.

- AB A dialytic battery (DB) with ion-exchange ~~\*\*\*membranes\*\*\*~~ can convert the mixing free energy into the elec. energy. The solar ~~\*\*\*membrane\*\*\*~~ cell (SMC) which was proposed by one of the present authors consists of DB and a ~~\*\*\*solar\*\*\*~~ ~~\*\*\*still\*\*\*~~. The seawater is sepd. into the fresh water and the concd. seawater by flowing through the ~~\*\*\*solar\*\*\*~~ ~~\*\*\*still\*\*\*~~. Therefore, in order to seek a feasibility of SMC it needs to make a performance test of DB at higher concn. than the seawater. In the present study, an exptl. study has been made on the concn. dependence of the DB-performance. The dialytic battery constructed consists of 101 compartments and has an effective area of 475 cm<sup>2</sup> per sheet of ion-exchange ~~\*\*\*membrane\*\*\*~~. The carbon plate electrodes were used, which would produce not only an elec. power, but also useful materials such as Cl<sub>2</sub>, H<sub>2</sub> gas as a result of the electrode reaction. The saline water concn. cc ranged from 3.5 .apprx. 17 wt%. The open circuit potential decreased from 9 to 7 V with increasing cc. The power output, however, increased considerably with the increase in cc due to the decreases in the internal resistance: the max. power of about 1100 mW was obtained at the concn. of 17 wt%. The ~~Weinstein-Leitz model has been modified so as to be applicable to the present case.~~ An good agreement was obtained between the calcd. and the measured data.
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
- ST dialytic battery ion exchange ~~\*\*\*membrane\*\*\*~~; saline water dialytic battery power output; solar ~~\*\*\*membrane\*\*\*~~ cell dialytic battery
- IT Photoelectric devices, solar (consisting of dialytic battery with ion-exchange ~~\*\*\*membranes\*\*\*~~ and ~~\*\*\*solar\*\*\*~~ ~~\*\*\*still\*\*\*~~; dependence of the power output on the concn. of saline water in)
- IT Batteries, secondary (dialytic, with ion-exchange ~~\*\*\*membranes\*\*\*~~; dependence of the power output on the concn. of saline water in)
- IT Ion exchangers (~~\*\*\*membranes\*\*\*~~, solar ~~\*\*\*membrane\*\*\*~~ cell consisting of dialytic battery with)
- IT Waters, natural (saline, dialytic battery with ion-exchange ~~\*\*\*membranes\*\*\*~~ - dependence of the power output on the concn. of saline water)

L33 ANSWER 6 OF 13 HCA COPYRIGHT 2002 ACS  
 122:19634 High resolution infrared spectra of ~~\*\*\*silicon\*\*\*~~ monoxide and ~~\*\*\*silicon\*\*\*~~ isotopic abundances in cool luminous stars. Tsuji, T.; Ohnaka, K.; Hinkle, K. H.; Ridgway, S. T. (Institute Astronomy, University Tokyo, Mitaka, 181, Japan). Astron. Astrophys., 289(2), 469-91 (English) 1994. CODEN: AAEJAF. ISSN: 0004-6361.

- AB We report on high spectral resolu. observations of the 4 .mu.m SiO first overtone bands in six late-type M giants (M5-8III) and two M supergiants. For M supergiants as well as for M5-6 giants, line intensities and profiles of most 28SiO ~~\*\*\*lines\*\*\*~~ can be understood by a unique set of ~~\*\*\*silicon\*\*\*~~ abundance, micro- and macro-turbulence, once a model atm. is specified by a Teff which is confirmed by angular diam. measurement. In the latest M giants (M7-8III), strong ~~\*\*\*lines\*\*\*~~ of 28SiO show excess emission over the predictions based on classical model atmospheres. We suggest that emission of SiO from the outer atm. fills in the photospheric absorption. Many resolved ~~\*\*\*lines\*\*\*~~ and band heads due to 29SiO and 30SiO can be clearly identified in all the late M giant spectra surveyed. ~~\*\*\*Silicon\*\*\*~~ isotopic ratios are detd. by

AB A dialysis battery with ion-exchange \*\*\*membranes\*\*\* coupled with a \*\*\*solar\*\*\* \*\*\*still\*\*\*, named \*\*\*solar\*\*\* \*\*\*membrane\*\*\* cell (SMC), is under development, for generation of electricity from differences in salinity at river mouth regions. The power generation process is the reverse of conventional electrodialysis. Small scale system components were constructed and tests were done using an indoor solar simulator. The max. power output of a dialysis battery coupled to a \*\*\*solar\*\*\* \*\*\*still\*\*\* was 23.4 mW and is attributed to the increase in the equiv. conductance of dil. soln. due to increase of operating temp.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology) Section cross-reference(s): 72

ST dialytic battery \*\*\*membrane\*\*\* \*\*\*solar\*\*\* \*\*\*still\*\*\* ; ion exchange dialysis battery

IT Batteries, secondary (dialytic, \*\*\*solar\*\*\* \*\*\*still\*\*\* coupled to, fabrication and testing of)

IT Dialyzers ( \*\*\*membranes\*\*\*, reverse, elec. battery based on, testing of)

L33 ANSWER 9 OF 13 HCA COPYRIGHT 2002 ACS

118:179397 Abundances of refractory elements in the Orion nebula. Rubin, R. H.; Erickson, E. F.; Haas, M. R.; Colgan, S. W. J.; Simpson, J. P.; Dufour, R. J. (Ames Res. Cent., NASA, Moffett Field, CA, 94035, USA). Symp. - Int. Astron. Union, 150(Astrochemistry of Cosmic Phenomena), 281-3 (English) 1992. CODEN: IASYAE. ISSN: 0074-1809.

AB The authors gas-phase abundances of \*\*\*Si\*\*\*, C, and Fe from recent measurements of Si<sup>2+</sup>, C<sup>2+</sup>, and Fe<sup>2+</sup> in the Orion Nebula by expanding on earlier blister models. The Fe<sup>2+</sup> 22.9 .mu.m line measured with the KAO yields Fe/H .apprxeq. 3.times.10<sup>-6</sup> - considerably larger than in the diffuse interstellar matter, where relative to solar, Fe/H is down by .apprx.100. However, in Orion, Fe/H is \*\*\*still\*\*\* lower than \*\*\*solar\*\*\* by a factor .apprx.10. The C and \*\*\*Si\*\*\* abundances are derived from new IUE high dispersion spectra of the C<sup>2+</sup> 1907, 1909 .ANG. and Si<sup>2+</sup> 1883, 1892 .ANG. \*\*\*lines\*\*\*. Gas-phase \*\*\*Si\*\*\* /C = 0.016 in the Orion ionized vol. and is particularly insensitive to uncertainties in extinction and temp. structure. The solar value is 0.098. Gas-phase C/H = 3.times.10<sup>-4</sup> and \*\*\*Si\*\*\* /H = 4.8.times.10<sup>-6</sup>. Compared to solar, \*\*\*Si\*\*\* is depleted by 0.135 in the ionized region, while C is essentially undepleted. This suggests that most \*\*\*Si\*\*\* and Fe resides in dust grains even in the ionized vol.

CC 73-9 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST abundance refractory element Orion nebula; \*\*\*silicon\*\*\* abundance Orion nebula; carbon abundance Orion nebula; iron abundance Orion nebula

IT 7439-89-6, Iron, occurrence 7440-21-3, \*\*\*Silicon\*\*\*, occurrence 7440-44-0, Carbon, occurrence (abundance of, in Orion nebula)

IT 14175-55-4, \*\*\*Silicon\*\*\* (2+), properties 15438-31-0, Iron(2+), properties 16092-61-8, Carbon(2+), properties (spectral \*\*\*lines\*\*\* of, in spectra of Orion nebula)

potential. The great strengthening, in spots, of numerous metallic  
 \*\*\*lines\*\*\* and the weakening of some \*\*\*lines\*\*\* of ionized  
 elements afford striking evidence of the reduced temp. in sunspots.  
 But apart from thermal effects the intensities of at. \*\*\*lines\*\*\*  
 in spot spectra are modified also by the magnetic fields of the  
 spots, \*\*\*lines\*\*\* with complex Zeeman patterns being affected  
 differently than those with simple patterns. The chem. origins of  
 the \*\*\*lines\*\*\* are assigned not only by coincidence with  
 well-detd. lab. wave lengths for the various atoms and mols. but  
 also by the consistency of their behavior in multiplets in regard to  
 level sepns. and intensities. In fact many \*\*\*lines\*\*\* not  
 observed in emission in lab. sources are observed as solar  
 absorption \*\*\*lines\*\*\* as transitions between well-established  
 at. energy levels. Most of the elements recognized in the sun can  
 be certified by \*\*\*lines\*\*\* of wave length shorter than 6600 A.,  
 but Rb, P, Li, and N owe their identification as solar constituents  
 solely to \*\*\*lines\*\*\* comprised in the present tabulation. The  
 occurrence of \*\*\*lines\*\*\* in the sun's atm. is assocd. with both  
 the abundance and the excitation potentials of the elements. Most  
 of the infrared solar \*\*\*lines\*\*\* result from transitions among  
 terms of high energy, so that strong absorption by H, C, and  
 \*\*\*Si\*\*\* is here assocd. with high excitation potential. Although  
 the quant. analysis of the \*\*\*solar\*\*\* atm. is \*\*\*still\*\*\*  
 incomplete, the elements H, He, C, N, O, Mg, and \*\*\*Si\*\*\* are  
 the most abundant, with H and He about 1000-fold greater than the  
 other 5 elements. Bibliography.

CC 3 (Subatomic Phenomena and Radiochemistry)

L33 ANSWER 13 OF 13 HCA COPYRIGHT 2002 ACS  
 24:16407 Original Reference No. 24:1795b-c The spectrum of the sun's  
 corona. Mecke, R.; Wildt, R. Z. Physik, 59, 501-7 (Unavailable)  
 1930.

AB The origin of the emission \*\*\*lines\*\*\* in the \*\*\*solar\*\*\*  
 corona is \*\*\*still\*\*\* one of the puzzles of astrophysics.  
 Attempts to account for them as transitions between metastable  
 states of spectra characteristic of atoms of low at. wt., as was  
 done by Bowen in the nebular \*\*\*lines\*\*\* (C. A. 22, 1730), have  
 been unsuccessful. A tentative hypothesis is here proposed that  
 they represent the Raman scattering of strong ultra-violet O and  
 \*\*\*Si\*\*\* \*\*\*lines\*\*\* by the clouds of H, He and Ca+ which rise  
 high above the sun's surface. E. g., the wave no. of the well-known  
 green corona line is 18,852 cm.-1; that of the first member of the  
 Lyman series of H is 82,258 cm.-1. Their sum 101, 110 is very close  
 to the wave no. of the O line at 988.7 A. U. Five other coronal  
 \*\*\*lines\*\*\* are similarly accounted for.

CC 3 (Subatomic Phenomena and Radiochemistry)

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L18 ANSWER 1 OF 15 HCA COPYRIGHT 2002 ACS  
 135:200052 Experimental and theoretical study of basin-type-multiple-  
 effect coupled solar still. Tanaka, Hiroshi; Nosoko, Takehiro;  
 Nagata, Takashi (Kurume National College Technology, Japan). Taiyo  
 Enerugi, 27(2), 59-66 (Japanese) 2001. CODEN: TAENAW. ISSN:  
 0388-9564. Publisher: Nippon Taiyo Enerugi Gakkai.

AB Newly designed multiple-effect solar stills with a triangle  
 cross-section consisting of a horizontal basin \*\*\*liner\*\*\*, a  
 tilted double glass cover and the vertical parallel partitions in  
 contact with saline-soaked wicks were constructed and the  
 productivity of distillate was measured on several days in autumn

and winter at Okinawa, Japan. The heat and mass transfer processes occurring in the stills were theor. analyzed to predict the performance of the stills. The results and theor. predictions show that the prodn. rate of distillate is drastically increased by narrowing the vapor-diffusion gaps between partitions and increasing the no. of the partitions. The still consisting of 8 partitions with 5 mm diffusion gaps produced 10.0-12.7 Kg/m<sup>2</sup>-day at 18.8-21.9 MJ/m<sup>2</sup>-day solar radiation on the glass cover, showing that the newly designed still is 3.2-3.5 times more productive than the basin type still. These exptl. values for the productivity are lower by 14% than the predicted ones. A discussion on this discrepancy is presented.

CC 61-4 (Water)

Section cross-reference(s): 52

IT Water purification

( \*\*\*distn\*\*\* ., \*\*\*solar\*\*\* ; exptl. and theor. study of basin-type-multiple-effect coupled solar still)

L18 ANSWER 2 OF 15 HCA COPYRIGHT 2002 ACS

134:76039 Parametric investigation of a basin-type-multiple-effect coupled solar still. Tanaka, H.; Nosoko, T.; Nagata, T. (Department of Mechanical and Systems Engineering, Faculty of Engineering, University of Ryukyus, Okinawa, 903-0213, Japan). Desalination, 130(3), 295-304 (English) 2000. CODEN: DSLNAH. ISSN: 0011-9164. Publisher: Elsevier Science B.V..

AB Parametric anal. was performed for the basin-type multiple-effect coupled solar still with a triangle cross-section consisting of a horizontal basin \*\*\*liner\*\*\* and a no. of vertical parallel partitions in contact with saline-soaked wicks with narrow gaps between the partitions, under dry weather conditions at 26.1.degree.N latitude. The productivity of the still increased in winter with an increase in the angle between the glass cover and the basin and decreased in summer. In the spring and autumn seasons productivity had a gentle peak between a 40.degree.- and 45.degree.-angle. Increasing supply rates of saline water to the wicks and increasing initial mass of the basin water decreased productivity. With a decrease in diffusion gaps between partitions, productivity exponentially increased, and it also showed exponential increases with an increase in the no. of distn. cells between the partitions. The productivity of the still of 13 partitions with 5-mm gaps and a 40.degree.-angle of the glass cover was 4 times more than the basin-type stills, and the still was more productive than the conventional multiple-effect stills by .gtorsim.40%.

CC 61-5 (Water)

IT Water purification

( \*\*\*distn\*\*\* ., \*\*\*solar\*\*\* ; parametric investigation of basin-type-multiple-effect coupled solar still)

L18 ANSWER 3 OF 15 HCA COPYRIGHT 2002 ACS

134:76013 A highly productive basin-type-multiple-effect coupled solar still. Tanaka, H.; Nosoko, T.; Nagata, T. (Department of Mechanical and Systems Engineering, Faculty of Engineering, University of Ryukyus, Okinawa, 903-0213, Japan). Desalination, 130(3), 279-293 (English) 2000. CODEN: DSLNAH. ISSN: 0011-9164. Publisher: Elsevier Science B.V..

AB A newly designed, multiple-effect solar still with a triangle cross-section consisting of a horizontal basin \*\*\*liner\*\*\*, a tilted double glass cover, and vertical parallel partitions in contact with saline-soaked wicks is discussed and theor. analyzed. Solar radiation is absorbed in the basin and in the first partition,

L18 ANSWER 8 OF 15 HCA COPYRIGHT 2002 ACS

118:66489 Effects of pebbles and wick on the performance of a shallow basin solar still. Chendo, M. A. C.; Egariwe, S. U. (Dep. Phys., Univ. Lagos, Lagos, Nigeria). Sol. World Congr., Proc. Bienn. Congr. Int. Sol. Energy Soc., Meeting Date 1991, Volume 2, Issue Pt. 2, 2264-9. Editor(s): Arden, M. E.; Burley, Susan M. A.; Coleman, Martha. Pergamon: Oxford, UK. (English) 1992. CODEN: 58KQAF.

AB A comparative performance study on the effects of pebbles, charcoal, and wick on single sloped shallow basin solar still is presented. Distn. rates of the participating stills between sun rise and sun set increased in the following order: charcoal, wick, control still, and pebble. Compared to daily solar irradiance, the max. irradiance point occurred hours before that of the resp. stills in the order above. Comparison of daily productivity shows that the pebble \*\*\*lined\*\*\* still has the greatest yield, with max. yield occurring 4 h after sunset (due to its better heat storage capability).

CC 61-5 (Water)

Section cross-reference(s): 52

ST ~~\*\*\*distn\*\*\* water \*\*\*solar\*\*\* still; pebble \*\*\*solar\*\*\*~~  
still water \*\*\*distn\*\*\* ; wick \*\*\*solar\*\*\* still water  
\*\*\*distn\*\*\* ; charcoal \*\*\*solar\*\*\* still water \*\*\*distn\*\*\*

IT Water purification  
( \*\*\*distn\*\*\* ., \*\*\*solar\*\*\* pebble/charcoal/wick still in)

L18 ANSWER 9 OF 15 HCA COPYRIGHT 2002 ACS

113:197481 System analysis of dual purpose cycle for desalinated water and power production. El-Sharkawy, A. I.; Aly, S. L. (Natl. Res. Cent., Cairo, Egypt). Heat Recovery Syst. CHP, 10(2), 107-17 (English) 1990. CODEN: HRSCEQ. ISSN: 0890-4332.

AB A comprehensive study of the characteristics of a solar powered dual purpose plant for simultaneous prodn. of fresh water and elec. power was carried out. The dual purpose (hybrid) cycle consisted of an open water cycle and a Freon-12 closed power cycle \*\*\*interlinked\*\*\* in the heater and condenser of the power cycle. The hybrid system operating conditions and criteria for adjusting the ratio of fresh water prodn. to power generation is described and their effects on the total system are evaluated. The results indicated an increase of desalinated water and output work with the increase of hot water pressure and temp. The increase of max. pressure in the power cycle decreases the amt. of desalination and increases the output work up to a certain limit. The inlet water temp. has no effect on the rate of fresh water prodn., but its increase results in a decrease in the output work. The system study showed the advantages of the proposed cycle as compared to other single purpose plants for desalination of power generation.

CC 61-4 (Water)

Section cross-reference(s): 52

IT Water purification  
(desalination, \*\*\*solar\*\*\* powered flash \*\*\*distn\*\*\*  
elec. cogenerating plant for)

IT Water purification  
( \*\*\*distn\*\*\* ., flash, desalination by, \*\*\*solar\*\*\*  
powered elec. cogeneration plant for)

L18 ANSWER 10 OF 15 HCA COPYRIGHT 2002 ACS

111:120501 Performance of a double-basin solar still in the presence of dye. Dutt, D. K.; Kumar, Ashok; Anand, J. D.; Tiwari, G. N. (Dep. Phys., M. M. H. Coll., Ghaziabad, India). Appl. Energy, 32(3), 207-23 (English) 1989. CODEN: APENDX. ISSN: 0306-2619.

AB The performance of a double-basin solar still for the treatment of brackish water in New Delhi, India, was improved by addn. of dye to the water in the still, with the daily productivity being increased by almost 2 kg/m<sup>2</sup> per day, and efficiency increase of .apprx.10%. The fracture of solar energy absorbed by the basin \*\*\*liner\*\*\* and the lower water mass depended mainly on the addn. of dye; the contribution of the water depth was not significant. The evaporative heat-transfer coeffs. were strong functions of temp., while the conductive and radiative heat-transfer coeffs. varied little with temp.

CC 61-4 (Water)

Section cross-reference(s): 41, 52

ST solar still water dye addn; \*\*\*distn\*\*\* \*\*\*solar\*\*\* water performance dye; model \*\*\*solar\*\*\* \*\*\*distn\*\*\* dye addn

IT \*\*\*Solar\*\*\* energy (brackish water \*\*\*distn\*\*\* . by, \*\*\*solar\*\*\* still for, performance of, dye addn. to water in relation to)

IT Process simulation, physicochemical (of \*\*\*distn\*\*\* . of brackish water in \*\*\*solar\*\*\* still, dye addn. effect on)

IT Dyes ( \*\*\*solar\*\*\* \*\*\*distn\*\*\* . of brackish water contg., performance of solar still in)

IT Water purification (desalination, of brackish water, by \*\*\*solar\*\*\* \*\*\*distn\*\*\* ., still for, performance of, dye addn. effect on)

IT Water purification ( \*\*\*distn\*\*\* ., of brackish water, \*\*\*solar\*\*\* still for, performance of, dye addn. effect on)

L18 ANSWER 11 OF 15 HCA COPYRIGHT 2002 ACS  
109:236598 Thermal modelling of high-temperature distillation. Dutt, D. K.; Rai, S. N.; Tiwari, G. N. (Dep. Phys., M.M.H. Coll., Ghaziabad, 110 016, India). Energy Convers. Manage., 28(2), 151-9 (English) 1988. CODEN: ECMADL. ISSN: 0196-8904.

AB Math. modeling of the operation of a single-basin solar still under various modes of operation indicated that the water depth in the solar still and the absorptivity of the basin \*\*\*liner\*\*\*, along with the water flow over the glass cover of the still, considerably affect the daily distillate prodn. of the system. The thermosiphon mode enhances daily distillate prodn. The evaporative heat transfer coeff. is a very strong function of the temp. The system in which the still is coupled to a flat-plate collector with water flowing over the glass cover has the highest efficiency.

CC 61-4 (Water)

Section cross-reference(s): 48, 52

ST model \*\*\*solar\*\*\* \*\*\*distn\*\*\* water

IT Process simulation, physicochemical (of \*\*\*distn\*\*\* ., in \*\*\*solar\*\*\* still)

IT Water purification ( \*\*\*distn\*\*\* ., in \*\*\*solar\*\*\* still, modeling of)

IT Heating ( \*\*\*solar\*\*\*, \*\*\*distn\*\*\* . by, in \*\*\*solar\*\*\* still, modeling of)

IT \*\*\*Distillation\*\*\*  
\*\*\*Distillation\*\*\* apparatus  
( \*\*\*solar\*\*\*, modeling of)

L18 ANSWER 12 OF 15 HCA COPYRIGHT 2002 ACS  
109:61178 Transient analysis of a spherical solar still. Dhiman, Naresh

IT      \*\*\*Distillation\*\*\*      apparatus  
         (    \*\*\*solar\*\*\*    )

L18    ANSWER 15 OF 15    HCA    COPYRIGHT 2002 ACS

68:81340    Patmos    \*\*\*solar\*\*\*    \*\*\*distillation\*\*\*    plant.  
Delyannis, Anthony A.; Piperoglou, E. (Tech. Univ., Athens, Greece).  
Eur. Symp. Fresh Water Sea, Prepr. Pap., 2nd, Volume 8, Issue 136, 4  
pp. (English) 1967.    CODEN: 19DGAF.

AB    A low cost, long life, and increased daily water production,  
\*\*\*solar\*\*\*    energy    \*\*\*distn\*\*\*    . plant was designed.    The still  
was covered with glass, had an evapg. area of 8667 sq. m., and  
claimed to yield 6864 gallons/day.    The plant has 71 units which are  
3.29 by 40 m., have a concrete basin, and are    \*\*\*lined\*\*\*    with  
butyl rubber sheeting.    A plastic sealing material replaced putty  
around the glass since abs. sealing was a very important factor in  
the operation of solar stills.    Black Orlon was first used as a  
radiation absorbent black body but it promoted the formation of  
scale and its use was suspended.    All piping, tubing, and valves are  
made of poly(vinyl chloride).    The connecting flanges are made of  
polypropylene.    Two underground reservoirs below the plant collect  
the production or rain water and pump it to the community reservoir.

CC    61 (Water)  
ST    \*\*\*DISTN\*\*\*    PLANT    \*\*\*SOLAR\*\*\*    ;    \*\*\*SOLAR\*\*\*    \*\*\*DISTN\*\*\*  
PLANT

IT    Water purification  
         (    \*\*\*distn\*\*\*    .,    \*\*\*solar\*\*\*    plant for, at Patmos, Greece)

IT    \*\*\*Distillation\*\*\*    apparatus  
         (    \*\*\*solar\*\*\*    , at Patmos, Greece)



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| S2  | 3319    | (SOLAR? OR SUNSHIN? OR SUN OR SUNS OR SUNNED OR SUNNING? ?-<br>(5N)(DISTILL? OR DIST? ? OR DISTN? ? OR CODISTILL? OR CODIST?<br>? OR CODISTN? ?) |
| S3  | 8366    | (ALUMINUM? ? OR ALUMINIUM? ? OR AL)(3N)INSULAT? OR CELOTEX?<br>? OR THERMAX? ?   |
| S4  | 435677  | BASIN? OR BOWL?  |
| S5  | 2505155 | CONTAINER? OR VESSEL? OR FLASK? OR RECEPTACL? OR CHAMBER?  |
| S6  | 1331808 | LINER? OR LINING? ? OR LINED OR LINES OR INTERLIN?   |
| S7  | 1064730 | MEMBRAN?   |
| S8  | 1832916 | SILICON OR SI OR DOW OR CORNING  |
| S9  | 2       | (S1 OR S2) AND S3  |
| S10 | 983     | (S1 OR S2) AND S4  |
| S11 | 267     | (S1 OR S2) AND S5  |
| S12 | 139     | (S1 OR S2) AND S6  |

S13 150 (S1 OR S2) AND S7  
 S14 113 (S1 OR S2) AND S8  
 S15 87 (S10 OR S11) AND S12  
 S16 15 (S10 OR S11) AND S13  
 S17 3 (S10 OR S11) AND S14  
 S18 5 S12 AND S13  
 S19 3 S12 AND S14  
 S20 3 S13 AND S14  
 S21 7 S10 AND S11 AND S12  
 S22 22 S9 OR S17 OR S18 OR S19 OR S20 OR S21  
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 (Naples), Italy

Bianchi, G.  
 ENEA, Casaccia (Italy). Dipt. Fonti Alternative e Risparmio Energetico.

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To contribute to the effort worldwide spent to overcome the problems  
 still open on the solar cells technology concerning both the technical  
 aspects and the economics, the CRIF, a research center entirely dedicated  
 to photovoltaics, has been settled in Portici (Naples), Italy. The CRIF  
 (Centro Ricerche Fotovoltaiche) activities will cover the whole cycle of  
 a-Si:H solar cell technology, starting from the fabrication processes to  
 the characterization of the materials and devices, module testing and solar  
 cell applications. The laboratories are going to be accomodated in a  
 building of almost 10.000 square meters. This paper reports on the lines of  
 the ongoing research activities (at present focused on amorphous silicon  
 and its alloys), and on the research staff.

Descriptors: \*Photovoltaic Cells; Amorphous State; Appropriate Technology  
 ; Commercialization; ENEA; Hydrogen Additions; Laboratories; Professional  
 Personnel; Research Programs; Silicon Alloys; Test Facilities

24/7,DE/2 (Item 1 from file: 2)  
 DIALOG(R)File 2:INSPEC  
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6339350 INSPEC Abstract Number: A1999-20-9730-006

Title: Light element non-LTE abundances of lambda Bootis stars. I  
Author(s): Paunzen, E.; Kamp, I.; Iliev, I.Kh.; Heiter, U.; Hempel, M.;  
Weiss, W.W.; Barzova, I.S.; Kerber, F.; Mittermayer, P.  
Author Affiliation: Inst. fur Astron., Wien Univ., Austria  
Journal: Astronomy and Astrophysics vol.345, no.2 p.597-604  
Publisher: Springer-Verlag,  
Publication Date: 10 May 1999 Country of Publication: Germany  
CODEN: AAEJAF ISSN: 0004-6361  
SICI: 0004-6361(19990510)345:2L:597:LEAB;1-I  
Material Identity Number: A201-1999-016  
Language: English Document Type: Journal Paper (JP)  
Treatment: Experimental (X)

Abstract: Abundances for the light elements of lambda Bootis stars are a main key to understand the astrophysical processes behind the so-called lambda Bootis phenomenon. These stars are characterized by a typical abundance pattern (strong underabundances of the Fe-peak elements whereas the light elements have apparently solar abundances) which is still based mainly on LTE-calculations. Therefore we started an investigation to derive accurate abundances of the light elements (C, N, O and S). For this purpose a new oxygen model atom was implemented in the Kiel non-LTE code. High resolution and high signal-to-noise spectra were used. For each element only a single wavelength region with lines of the specific element was selected and observed in order to avoid contamination from other elements. In the first paper we present abundances for carbon and oxygen of a statistically significant number of well established lambda Bootis stars. The second paper will deal with nitrogen and sulphur. The most important result is that on average carbon is less abundant than oxygen but still both elements are significant more abundant than the Fe-peak elements. Furthermore the anticorrelation of carbon and oxygen with the silicon abundance is proven, which strongly supports the accretion/diffusion theory. (35 Refs)

Subfile: A

Descriptors: carbon; element relative abundance; oxygen; stars; stellar atmospheres; stellar composition; stellar spectra  
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24/7,DE/3 (Item 2 from file: 2)  
DIALOG(R)File 2:INSPEC  
(c) 2002 Institution of Electrical Engineers. All rts. reserv.

6157081 INSPEC Abstract Number: A1999-06-8630S-001

Title: Thermal modelling of a double condensing chamber solar still: an experimental validation

Author(s): Aggarwal, S.; Tiwari, G.N.  
Author Affiliation: Centre for Energy Studies, Indian Inst. of Technol.,  
New Delhi, India

Journal: Energy Conversion and Management vol.40, no.1 p.97-114

Publisher: Elsevier,

Publication Date: Jan. 1999 Country of Publication: UK

CODEN: ECMADL ISSN: 0196-8904

SICI: 0196-8904(199901)40:1L:97:TMDC;1-2

Material Identity Number: E303-1998-012

U.S. Copyright Clearance Center Code: 0196-8904/99/\$19.00

Document Number: S0196-8904(98)00110-1

Language: English Document Type: Journal Paper (JP)

Treatment: Theoretical (T); Experimental (X)

Abstract: A thermal model of a double condensing chamber solar still (DCS) has been presented. The thermal model is based on energy balance equations for the different components of a double condensing chamber solar

still (DCS), namely the water mass, the first and second condensing covers and the basin liner, including the reflecting mirror. Experiments were conducted for both the single slope conventional solar still (CSS) and double condensing chamber solar still (DCS) on an hourly basis for comparison of their performance. Numerical computations for evaluating the hourly temperatures and yield have been performed for Delhi climatic conditions. The obtained results have been compared with the experimental observations. It is observed that there is a fair agreement between the theoretical and experimental observations. (24 Refs)

Subfile: A

Descriptors: condensation; distillation; mirrors; solar absorber-convertors; thermal analysis

Copyright 1999, IEE

24/7,DE/4 (Item 3 from file: 2)

DIALOG(R) File 2:INSPEC

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~~4905199~~ INSPEC Abstract Number: A9507-8630S-008, B9504-8460-066

Title: Solar energy via salino voltaics from brine and water regenerated via solar stills

Author(s): Walles, W.E.; Mulford, L.C.

Author Affiliation: Coalition Technol. Ltd., Midland, MI, USA

Part vol.4 p.1736-40 vol.4

Publisher: AIAA, Washington, DC, USA

Publication Date: 1994 Country of Publication: USA 4 vol. xxxiii+1959

PP.

Conference Title: Proceedings of 29th Intersociety Energy Conversion Engineering Conference - IECEC'94

Conference Date: 7-11 Aug. 1994 Conference Location: Monterey, CA, USA

Language: English Document Type: Conference Paper (PA)

Treatment: Practical (P)

Abstract: A system is described for generating electricity, fully solar derived, using novel electrochemical (saline voltaic) cells coupled to a solar still for regeneration of the three working fluids. These fluids are stored separately, permitting electricity on demand, regardless of sunshine. The cells are fed by two liquids, brine and water. Diluted brine exits from the cells and enters a solar still. The solar still captures solar energy to distill water out of the diluted brine, leaving concentrated brine. Thus, water and brine again flow separately into the electrochemical cells completing the no-waste circuit of working fluids. Among the features are: (1) this novel closed-loop system creates electricity in a renewable way without depleting fossil fuels or releasing CO/sub 2/ into air; (2) it can generate electricity when there is no sun for days or weeks; (3) no need for silicon chips or solar concentrators, the primary gathering sites for solar energy are covered with a novel plastic film, promising low cost primary collection; (4) the whole solar spectrum is useful as heat energy; (5) no dangerous or costly materials are used; (6) the system can run on low grade heat, such as hot water; (7) the system requires a special brine, which is recycled without waste; (8) it generates electricity without membranes by utilizing a flow through cell; (9) voltages measured are between 0.20 and 0.80 Volts per primary cell; and (10) primary voltage depends on the concentration difference between brine and water, temperature and uneven diffusing effect. (11 Refs)

Subfile: A B

Descriptors: cells (electric); distillation; photoelectrochemical cells; solar absorber-convertors; solar power

Copyright 1995, IEE

Mediterranean, especially in Alexandria and Athens, then much later in Italy. The Arabian Islamic Civilization has engraved several thumbprints on the path of distillation. An ingenious distiller with built-in internal reflux was found with Arabic writing below, to describe the device. Moreover, Demusquain glass was used in making lenses as solar heat concentrators for distillation. During this millennium colonialism, which brought prosperity to some through exploitation of resources and the deprivation of the colonized masses, implemented desalination as one of its tools on board ships and within the so-called prosperous new found lands. With the increase of water demand and emphasis on desalination technology due to shortage of underground resources in the kingdom, the government of Saudi Arabia established the Saline Water Conversion Corporation (SWCC) in 1974. Since the SWCC has grown and become the authority to look after all matters related to seawater desalination. At present SWCC has 27 plants producing 668MGD of desalinated water and 4115MW of electricity from existing operating plants. Additional four plants with a total capacity of 218MGD of water and 999MW of electrical power are under construction. This will take total desalinated water production to 886MGD and electrical power generation of 5114MW. The last three decades have seen a tremendous growth of SWCC along a few different lines, such as: a) enhanced production capacity of desalinated water, b) self administered operation and maintenance, c) execution of trouble shooting and applied projects, d) development of experience-based design concept, e) venturing into new technology and/or carry out modifications, into existing ones, f) promote Saudization in all disciplines of desalination. With the immense interest and concern in developing seawater desalination industry to minimize cost, upgrade performance and prolong life of plants, a Research and Development Center (RDC) was established and inaugurated in 1987 to achieve these objectives. The center has five sections, Thermal, Reverse Osmosis, Corrosion, Chemistry, and Ecology and Marine Biology. The center is equipped with most advanced and sophisticated equipment in addition to a multistage flash (MSF) and several RO pilot plants. The RDC helps in solving problems in operating plants thus leading to higher efficiencies and longer plant life. RDC also helps in the selection of ideal materials and chemicals for eventually achieving lower production cost. Studies to protect the environment have also been carried out. Since its inception the RDC has completed 117 projects in various aspects of desalination, some of which begot from problems encountered during plant operation. Moreover, SWCC Research and Development (R&D) and Studies and Designs (S&D) Departments are the corporate THINK TANKS for the future. SWCC activities have opened eyes into new horizons far behind the traditional ones. Lofty stands up high, as a new milestone which was brought into adaptation is nanofiltration of seawater as pretreatment, potentially for all desalination processes. In other words recent efforts at the center yielded a novel approach to membrane and thermal seawater desalination processes using nanofiltration (NF) membrane. This patented concept of using NF as pretreatment to both RO and MSF processes enhances the production of desalted water by more than 60% and reduces the cost by about 30%, yet it is an environmentally friendly process. Preliminary results of studies on NF indicate that this new concept could one day revolutionize desalination technology. Other prospective horizons are by conducting applied research on: a) design, commissioning then operation of large capacity distillers, b) hybridization of desalination processes, c) exploration of alternative energy sources for desalination, e.g., solar and nuclear, d) search for suitable and cost effective chemicals, alloys and synthetic materials, e) new design for very large number membrane elements housing (the proposed vessel is envisioned to be like a heat exchanger and/or a steam drum), f) designing, building and testing elevated top brine temperature (TBT) MSF process at (and/or above) 160 deg. C, g) treatment and safe disposal of waste generated through better understanding of environment interactive

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014269493

WPI Acc No: 2002-090191/200212

Production of fresh water from salt water, etc. by distillation uses counter-current evaporator-condenser with non-condensing gas on evaporating side

Patent Assignee: THIRD MILLENIUM WATER CO (THIR-N); THIRD MILLENIUM WATER CY SA (THIR-N)

Inventor: DOMEN J P; DOMEN J

Number of Countries: 096 Number of Patents: 003

Patent Family:

| Patent No    | Kind | Date     | Applicat No   | Kind | Date     | Week   |   |
|--------------|------|----------|---------------|------|----------|--------|---|
| WO 200196244 | A1   | 20011220 | WO 2001FR1832 | A    | 20010613 | 200212 | B |
| FR 2809968   | A1   | 20011214 | FR 20007480   | A    | 20000613 | 200212 |   |
| AU 200167640 | A    | 20011224 | AU 200167640  | A    | 20010613 | 200227 |   |

Priority Applications (No Type Date): FR 20007480 A 20000613

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes

WO 200196244 A1 F 47 C02F-001/14

Designated States (National): AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW

Designated States (Regional): AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TR TZ UG ZW

FR 2809968 A1 B01D-003/00

AU 200167640 A C02F-001/14 Based on patent WO 200196244

Abstract (Basic): WO 200196244 A1

Abstract (Basic):

NOVELTY - Distilling a liquid to remove dissolved impurities uses a counter-current evaporator-condenser. This recovers heat from the condensing stream to evaporate and/or heat a liquid to a partial pressure. This pressure is variable due to the presence of a non-condensing gas that keeps the total pressure constant.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for the following:

(a) a hollow or plate heat exchanger element has external surface(s) with devices efficiently distributing the flow by gravity and/or capillary action;

(b) a distillation apparatus with a high performance coefficient has a heating chamber with many pairs of hollow or plate heat exchange elements spaced uniformly and arranged vertically or inclined. Each element has similar devices on its external surface(s) for distributing flow uniformly. The upper and lower ends of the elements connect to collectors. A turbine circulates a hot non-condensable gas saturated with vapor through the elements. A gas/liquid separator is connected to the outlet of the upper collector and the gas passes to a heat exchanger. A boiler heats a liquid to be distilled and supplies it via the heat exchanger to gutters that distribute it evenly over the outside of the elements. Distillate is collected from the bottom of the separator and a concentrate is collected from the bottom of the chamber;

(c) a modification of (b) has two chambers; and

(d) another modification of (b) where the pairs of elements are alternately condensing and evaporating elements. A closed liquid circulation loop includes the evaporating elements, a cooler, the condensing elements and the boiler.

The flow distributing devices is agglomerated material, a permeable hydrophilic or wettable material or horizontal shallow parallel gutters. The element is made of material stable with liquids at most 100degreesC

USE - Production of fresh water from sea water.

ADVANTAGE - The apparatus is powered only by solar energy.

DESCRIPTION OF DRAWING(S) - The drawing shows solar powered distillation apparatus

solar boiler (222)

treatment chamber (223)

evaporation elements (224a-224c, 256a-256c)

condensation elements (226a, 226b)

collectors (232, 240, 244, 250, 258, 260)

pipes (234, 241, 243, 255, 263a, 263b)

insulated channels (235, 252)

connecting tubes (236a-236c, 238a-238c, 246a, 246b, 248a, 248b)

cooler (242)

column (254)

flow control valve (257)

reservoirs (259, 266)

shoes (261a, 261b)

condensate outlet tube (262)

valve (264)

plate (268)

transparent cover (270)

rigid, transparent sides (272a, 272b)

plugs (274, 276)

pp; 47 DwgNo 10/10

Title Terms: PRODUCE; FRESH; WATER; SALT; WATER; DISTIL; COUNTER; CURRENT; EVAPORATION; CONDENSER; NON; CONDENSATION; GAS; EVAPORATION; SIDE

Derwent Class: D15

International Patent Class (Main): B01D-003/00; C02F-001/14

International Patent Class (Additional): B01D-005/00; C02F-001/04

24/7, DE/13 (Item 2 from file: 351)  
DIALOG(R) File 351: Derwent WPI  
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013227241

WPI Acc No: 2000-399115/200034

Recycle of crystalline silicon photovoltaic modules includes providing an inert atmosphere and heating the module in the inert atmosphere

Patent Assignee: FIRST SOLAR LLC (FIRS-N)

Inventor: ANISIMOV I I; BOHLAND J R

Number of Countries: 001 Number of Patents: 001

Patent Family:

| Patent No  | Kind | Date     | Applicat No | Kind | Date     | Week     |
|------------|------|----------|-------------|------|----------|----------|
| US 6063995 | A    | 20000516 | US 98116287 | A    | 19980716 | 200034 B |

Priority Applications (No Type Date): US 98116287 A 19980716

Patent Details:

| Patent No  | Kind | Lan Pg | Main IPC    | Filing Notes |
|------------|------|--------|-------------|--------------|
| US 6063995 | A    | 8      | H01L-025/00 |              |

Abstract (Basic): US 6063995 A

Abstract (Basic):

NOVELTY - Recycling crystalline silicon photovoltaic modules comprises providing a crystalline silicon photovoltaic module comprising a glass substrate, layer(s) of polymeric material and solar

WPI Acc No: 1977-23834Y/197714

Liquids distillation by solar energy - using silicon membrane to separate liq. from airspace

Patent Assignee: DOW CORNING CORP (DOWO )

Number of Countries: 005 Number of Patents: 005

Patent Family:

| Patent No   | Kind | Date     | Applicat No | Kind | Date | Week     |
|-------------|------|----------|-------------|------|------|----------|
| DE 2604978  | A    | 19770331 |             |      |      | 197714 B |
| JP 52041168 | A    | 19770330 |             |      |      | 197719   |
| FR 2325402  | A    | 19770527 |             |      |      | 197726   |
| GB 1541283  | A    | 19790228 |             |      |      | 197909   |
| IT 1055062  | B    | 19811221 |             |      |      | 198211   |

Priority Applications (No Type Date): US 75617564 A 19750929

Abstract (Basic): DE 2604978 A

Mass of liq., esp. water, to be distilled is separated from an air space by a Si membrane. The membrane is permeable by the liquid and absorbs the solar radiation which falls on it. The liquid thus evaporates, and passes through the membrane to condense on the other face, which is at a lower temp. Means are provided to collect the condensate so formed.

The membrane can contain a pigment to absorb the solar radiation. It should be corrugated in sine wave form and be joined to the cover at several points. The cover should be a material which transmits solar radiation.

Title Terms: LIQUID; DISTIL; SOLAR; ENERGY; SILICON; MEMBRANE; SEPARATE; LIQUID; AIRSPACE

Derwent Class: A88; D15; J01

International Patent Class (Additional): B01D-003/02; C02B-001/04  
?t s25/7,de/all

25/7,DE/1 (Item 1 from file: 94)

DIALOG(R)File 94:JICST-EPlus

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04151159 JICST ACCESSION NUMBER: 99A0615051 FILE SEGMENT: JICST-E

Simulated Experiment on Solar Distillation Plant.

NAGAI NIRO (1); TAKEUCHI MASANORI (1); MASUDA SHUSAKU (2); YAMAGATA JUN (3)  
(1) Fukui Univ., Fac. of Eng.; (2) Fukui Univ.; (3) Pcjc

Nippon Dennetsu Shinpojiumu Koen Ronbunshu, 1999, VOL.36th,NO.Vol.1,  
PAGE.173-174, FIG.5, TBL.1, REF.4

JOURNAL NUMBER: F0872CAE

UNIVERSAL DECIMAL CLASSIFICATION: 662.997.002.5 628.16.08

LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan

DOCUMENT TYPE: Conference Proceeding

ARTICLE TYPE: Short Communication

MEDIA TYPE: Printed Publication

ABSTRACT: Simulated experiments of solar distillation were conducted in order to check some methods for improving efficiency in Japan by using electrical heaters instead of solar energy in UAE. The experimental apparatus was for simulating simple basin-type solar still using transparent film made of polyester as the ceiling of test cell. The obtained results indicated that the still efficiency can be largely improved by both enhancing cooling condition for upper surface of film and increasing surface wettability of lower surface of film. Further, some comments were stated on representative conventional heat transfer model on simple basin-type solar still. (author abst.)

DESCRIPTORS: solar desalination; solar thermal application; evaporation; condensation; experimental equipment; simulation; analytical model;



thermal efficiency; amount of evaporation; temperature fluctuation;  
polymer thin film  
BROADER DESCRIPTORS: demineralization; removal; desalination; modification;  
water treatment; water and sewage treatment; treatment; utilization;  
evapotranspiration; phase transition; equipment; mathematical model;  
model; efficiency; amount of evapotranspiration; fluctuation and  
variation; polymer membrane; functional polymer; macromolecule;  
membrane and film; thin film

25/7,DE/2 (Item 2 from file: 94)

DIALOG(R) File 94:JICST-EPlus

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00985813 JICST ACCESSION NUMBER: 90A0383950 FILE SEGMENT: JICST-E

The recovery fresh water from saline water by solar energy.

SEKI MORIO (1); SHIMIZU KATSUKO (1); NAKASHIO TAKEYUKI (1); HATA NORIYUKI  
(1)

(1) Industrial Res. Inst., Hiroshima Prefecture, West

~~Hiroshima Kenritsu Seibu Kogyo Gijutsu Senta Kenkyu Hokoku~~ (Bulletin of the  
Western Hiroshima Prefecture Industrial Research Institute), 1989,

NO.32, PAGE.69-72, FIG.8, TBL.1, REF.4

JOURNAL NUMBER: F0831ACF ISSN NO: 0915-194X

UNIVERSAL DECIMAL CLASSIFICATION: 662.997.002.5

LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan

DOCUMENT TYPE: Journal

ARTICLE TYPE: Original paper

MEDIA TYPE: Printed Publication

ABSTRACT: This study was carried out on the single roofed basin type solar  
still. As the clear cover of the still, glass plate, PET film and PMMA  
plate were used. The order of the penetration of solar insolation was  
PMMA, glass and PET cover still by blanktest, Through that of the state  
in distillation was glass, PET and PMMA cover still. Productivity of  
the distilled water was correlated to solar insolation in April. Amount  
of the produced distilled water has reached about 2.8l/(m2d) by the  
glass cover still, 2.0l/(m2d) by the PET film cover still and 1.6l/(m2d)  
when the solar insolation was 6.66kWh/(m2d). (author abst.)

DESCRIPTORS: solar desalination; sea water; transparent material;  
distillatory equipment; glass; polyethylene terephthalate; acrylic  
resin; membrane and film; optical transmission

BROADER DESCRIPTORS: demineralization; removal; desalination; modification;  
water treatment; water and sewage treatment; treatment; water; material  
; chemical equipment; equipment; separator(equipment); ceramics;  
thermoplastic; plastic; aromatic polyester; polyester; polymer;  
electromagnetic wave transmission; transmission(propagation)

25/7,DE/3 (Item 1 from file: 96)

DIALOG(R) File 96:FLUIDEX

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00393793 FLUIDEX NO: 0463617

An experiment with a plastic solar still

AUTHOR(S): Cappelletti G.M.

CORPORATE SOURCE: Facolta di Economia, University of Foggia, Via IV  
Novembre, Foggia 71100, Italy

AUTHOR EMAIL: g.cappelletti@unifg.it

Desalination, 142/3 (221-227), 2002

PUBLICATION DATE: March 1, 2002

CODEN: DSLNA ISSN: 0011-9164

COUNTRY OF PUBLICATION: Netherlands  
PUBLISHER ITEM IDENTIFIER: S0011916402002035  
DOCUMENT TYPE: Journal; Article  
RECORD TYPE: ABSTRACT  
LANGUAGES: English SUMMARY LANGUAGES: English  
NO. OF REFERENCES: 22

A solar still is a device which allows obtaining fresh water from seawater or brackish water. It utilizes the greenhouse effect by using solar energy. In a conventional solar still the production of fresh water in bright sunny weather and with warm air temperature is about 5-5.5 L mSUP-2 dSUP-1, according to the depth of the water in the solar still. In some devices it is possible to obtain efficiencies of up to 0.50 and 0.60. The aim of this research is to increase distillation productivity by utilizing the latent heat released by the condensing water steam. For this purpose the author built a solar still characterized by two basins (BSUB1 and BSUB2) superimposed upon each other. The building materials were a sheet of black Plexiglas for the bottom of the solar still, a sheet of transparent Plexiglas for all boxes, and a sheet of black polystyrene, used as insulating material. The solar still was hermetically sealed to reduce the leakage of vapor to the surroundings. The greatest quantity of fresh water obtained by the tested solar still was 1.7-1.8 L mSUP-2 dSUP-1. This result was achieved in the third week of July when solar radiation was 27-28 MJ mSUP-2 dSUP-1. The efficiency of the tested solar still was about 0.16. This low efficiency is probably due to the low temperature of the water contained in the still (about 50degreesC). The solar still has only been used in experiments for some months, during which it has not been possible to study the deterioration of the material (Plexiglas). These results show that an elaborate design and the increased costs for such design and construction do not always improve the water yield.

DESCRIPTORS: SOLAR STILL; DESALINATION; DISTILLATION; EXPERIMENTAL STUDY

25/7,DE/4 (Item 1 from file: 103)  
DIALOG(R)File 103:Energy SciTec  
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01666609 EDB-85-173390  
Author(s): Drutskiy, A.V.; Drutskaya, L.A.; Golovach, K.G.; Rodin, Yu.G.  
Title: Solar heating system  
Patent No.: SU 1084554  
Patent Assignee(s): Gos. proyekt. in-t stroit. mashinostr.  
Patent Date Filed: Filed date 5 Jul 1982  
Publication Date: 1983

p v

Note: PAT-APPL-346,044/24-06

Language: Russian

Availability: Plenum Publishing Corp., New York, N.Y.

Abstract: A system is planned which includes a solar heater, dosing tank above it and condenser under it which is connected by supply pipe to the solar evaporator, and removal pipe through the condensate collector and reverse valve, to the dosing tank. In order to intensify the process of heat exchange, the condensate collector is made in the form of a pump with individual membrane sealed gas container and equipped with an additional reverse valve set in the removal pipe of the condenser. The upper points of the solar evaporator and the dosing tank are connected by an additional pipeline.

Major Descriptors: \*SOLAR HEATING SYSTEMS

Descriptors: CONDENSERS; HEAT PIPES; SOLAR COLLECTORS; SOLAR STILLs; TANKS

Broader Terms: CONTAINERS; ENERGY SYSTEMS; EQUIPMENT; EVAPORATORS; HEATING  
SYSTEMS; SOLAR EQUIPMENT

25/7,DE/5 (Item 2 from file: 103)  
DIALOG(R)File 103:Energy SciTec  
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00747268 EDB-81-055526  
Title: Comments on western United States water resources  
Author(s): O'Meara, J.W.  
Title: Solar desalination workshop: proceedings  
Conference Title: Solar desalination workshop  
Conference Location: Denver, CO, USA Conference Date: 23 Mar 1981  
Publication Date: Mar 1981

p 33-37  
Report Number(s): SERI/CP-761-1077(Vol.1); CONF-810353-(Vol.1)

Language: English

Availability: NTIS, PC A12/MF A01.

~~Abstract: Brief comments about the water resources of Saudi Arabia are~~  
provided and the Western United States water problems are discussed in  
general terms. Emphasis is placed on the Colorado River Basin and the  
salinity problems of the region. The background information leading to  
the decision to build a 100 million gallon per day desalting plant at  
Yuma, Arizona, is reported. Some of the early solar humidification  
research and development sponsored by the Office of Saline Water is  
recalled.;

Major Descriptors: \*DESALINATION PLANTS; \*SAUDI ARABIA -- WATER RESOURCES;  
\*WATER RESOURCES; \*WESTERN REGION -- WATER RESOURCES

Descriptors: ARIZONA; CRYSTALLIZATION; IRRIGATION; MEMBRANES; MEXICO;  
SALINITY; SOLAR DISTILLATION; USA

Broader Terms: ASIA; DEVELOPING COUNTRIES; INDUSTRIAL PLANTS; LATIN AMERICA  
; NORTH AMERICA; PHASE TRANSFORMATIONS; RESOURCES; USA; WESTERN REGION

25/7,DE/6 (Item 1 from file: 117)  
DIALOG(R)File 117:Water Resour.Abs.  
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00704020 WRA NUMBER: 8802960

Annual Report: 1982-1983

Hawaii Univ. at Manoa Honolulu. Water Resources Research Center  
(1984). 66 p.

1984

DOCUMENT TYPE: Journal article

ABSTRACT: Research on several subjects was conducted at the Water  
Resources Research Center, Hawaii. The use of airport runway storm  
water runoff was not suitable as a source for drinking water.  
Clostridium perfringens was not a suitable indicator of water quality  
in streams receiving sewage effluents. The groundwater resources of  
Pearl Harbor basin are sufficient to support a population increase of  
450,000 provided sugarcane and pineapple cultivation are discontinued.  
Flexible impermeable membrane impoundments proved a feasible way to  
collect stream water in a coastal embayment. Wastewater reuse in drip  
irrigation was studied with emphasis on prevention of plugging of the  
tubes. Up to 91% BOD removal was accomplished in a rotating biological  
contactor under high salinity conditions. A low-cost solar still and  
rainfall catchment system was developed from a child's plastic wading  
pool. Wastewater irrigation studies showed that alfalfa and guineagrass  
removed 15% and 70%, respectively, of applied nitrogen. A pulsed-bed

filtration unit at a primary wastewater treatment plant removed 41% BOD and 38% COD. (Cassar-PTT)

DESCRIPTORS: Water treatment; Wastewater treatment; Wastewater irrigation; Irrigation; Water supply; Storm water; Indicators; Pearl Harbor; Hawaii ; Soil-water relationships; Drip irrigation; Solar distillation; Distillation; Viruses; Clostridium perfringens; Pollutant identification; Salinity; Fate of pollutants; Water pricing; Economic aspects; Remote sensing; Water conservation; Bacteria; Coliforms; Monitoring; Rainfall; Filtration

25/7,DE/7 (Item 2 from file: 117)  
DIALOG(R) File 117:Water Resour.Abs.  
(c) 2002 Cambridge Scientific Abs. All rts. reserv.

00703880 WRA NUMBER: 8800781  
Southwest Region Solar Pond Study for Three Sites - Tularosa Basin, Malaga Bend, and Canadian River  
Boegli, W J ; Dahl, M M ; Remmers, H E  
Bureau of Reclamation Denver, CO. Engineering and Research Center  
1984

NOTES: Available from the National Technical Information Service, Springfield VA 22161, as PB85-186211. Price codes: A04 in paper copy, A01 in microfiche. Report REC-ERC-83-17, August 1984. 77 p, 29 fig, 18 tab, 48 ref, 3 append.

DOCUMENT TYPE: Journal article

ABSTRACT: The Bureau of Reclamation investigated the technical and economic feasibility of using solar salt-gradient ponds to generate power and to produce freshwater in Bureau projects at three sites - the Canadian River at Logan, New Mexico Malaga Bend on the Pecos River near Carlsbad, New Mexico and the Tularosa Basin in the vicinity of Alamogordo, New Mexico. The ponds would be used to generate electric power that could be integrated with the Bureau 's power grid or used in combination with thermal energy from the ponds to power commercially available desalination systems to produce freshwater. Results of the economic analysis, which concentrated primarily on the Tularosa Basin site, showed that solar-pond-generated intermediate load power would cost between 62 and 90 mills/kWh and between 52 and 83 mills/kWh for baseload power. This results in benefit-cost ratios of approximately 2.0 and 1.3 for intermediate and baseload, respectively, when compared to similar facilities powered by fossil fuels. The cost savings are even more pronounced when comparing the two (solar versus fossil fuel) as a source of power for conventional distillation and membrane-type desalination systems. (Author 's abstract)

DESCRIPTORS: Cost analysis; Electric power production; Hydroelectric power ; Reclaimed water; Desalination; Electric power; Economic aspects; Saline water; Salinity; Solar energy; Thermal power; Desalination plants; Distillation; Fuel

25/7,DE/8 (Item 1 from file: 245)  
DIALOG(R) File 245:WATERNET(TM)  
(c) 2002 American Water Works Association. All rts. reserv.

007086 BK000037  
The Quest For Pure Water - Desalting  
Taras, Michael J.  
v2, p 169-193, 273, 274, c1981  
Publ: AWWA  
ISBN: 0-89867-248-1 (Vol. II)

Availability: AWWA  
36 references, figures  
Language: English  
Order No.: 10020 Price: A25  
Document Type: Book

Chapter XIV discusses the techniques of desalting used in the Middle East, Europe, and the United States. Desalting can be an economical way of providing potable water to an area with scarce or brackish water supplies. The cost of desalination is less than that of water importation in some regions. The distillation procedures described include the submerged tube, multiple effect (ME) evaporator chamber, multistage-flash (MSF), solar stills, the freeze crystallization process, electrodialysis, reverse osmosis, and ion-exchange demineralization. Distillation and the membrane processes are the ones most often found in larger desalting installations.

Descriptors: Desalination; Distillation

25/7,DE/9 (Item 1 from file: 351)  
DIALOG(R)File 351:Derwent WPI  
(c) 2002 Thomson Derwent. All rts. reserv.

004243423

WPI Acc No: 1985-070301/198512

Solar still with microporous membrane - adjacent wicking layer for use of liferafts

Patent Assignee: GORE & ASSOC INC W L (GORE )

Inventor: GORE D W

Number of Countries: 021 Number of Patents: 015

Patent Family:

| Patent No   | Kind | Date     | Applicat No | Kind | Date     | Week   |   |
|-------------|------|----------|-------------|------|----------|--------|---|
| GB 2145002  | A    | 19850320 | GB 8418441  | A    | 19840719 | 198512 | B |
| AU 8427647  | A    | 19850214 |             |      |          | 198514 |   |
| NO 8403033  | A    | 19850304 |             |      |          | 198516 |   |
| PT 79034    | A    | 19850322 |             |      |          | 198516 |   |
| DK 8403825  | A    | 19850211 |             |      |          | 198519 |   |
| EP 139880   | A    | 19850508 | EP 84108591 | A    | 19840720 | 198519 |   |
| JP 60068001 | A    | 19850418 | JP 84159482 | A    | 19840731 | 198522 |   |
| FI 8403051  | A    | 19850211 |             |      |          | 198523 |   |
| ZA 8403310  | A    | 19850530 | ZA 843310   | A    | 19840503 | 198535 |   |
| ES 8505620  | A    | 19851001 |             |      |          | 198603 |   |
| GB 2145002  | B    | 19870225 |             |      |          | 198708 |   |
| EP 139880   | B    | 19871014 |             |      |          | 198741 |   |
| DE 3466759  | G    | 19871119 |             |      |          | 198747 |   |
| IL 72627    | A    | 19870916 |             |      |          | 198747 |   |
| CA 1243612  | A    | 19881025 |             |      |          | 198847 |   |

Priority Applications (No Type Date): US 83521677 A 19830810

Cited Patents: EP 39197; EP 40411; US 2445350

Patent Details:

| Patent No  | Kind | Lan | Pg | Main IPC | Filing Notes |
|------------|------|-----|----|----------|--------------|
| GB 2145002 | A    |     | 5  |          |              |
| EP 139880  | A    | E   |    |          |              |

Designated States (Regional): AT BE CH DE FR GB IT LI LU NL SE

|           |   |   |
|-----------|---|---|
| EP 139880 | B | E |
|-----------|---|---|

Designated States (Regional): AT BE CH DE FR GB IT LI LU NL SE

Abstract (Basic): GB 2145002 A

A still includes a wicking layer adjacent a microporous membrane permeable to water vapour. Sea water is drawn across the wicking layer where it is heated by solar energy to release vapour which passes

through the membrane to condense on an impervious sheet underlying the membrane. Periodically distillate is removed and the wicking layer flushed to remove concentrate.

Pref. the microporous membrane is expanded PTFE having a thickness greater than 13 microns and pref. 200-300 microns.

USE/ADVANTAGE - The still floats in sea water to produce drinking water for use on a liferaft. The thickness of the membrane is controlled to establish a preset temp. difference to increase the efficiency of the still.

0/2

Abstract (Equivalent): EP 139880 B

A device for the distillation of aqueous liquid containing salt or other low volatility component comprising a microporous membrane permeable by water vapour but impermeable by water, a first liquid and vapour impermeable sheet spaced from one side of said microporous membrane to form therebetween a first chamber for said aqueous liquid, a liquid and vapour impermeable, heat conductive sheet disposed on the opposite side of the microporous membrane to form therebetween a distillate chamber from which distillate can be drawn off, characterised in that the first chamber contains a wicking material, capable of drawing an aqueous liquid and capable of being heated by heat passing through said first impermeable sheet which overlies the wicking material, through which aqueous solution can be passed on occasion to flush aqueous solution containing a high concentration of low volatility component out of said wicking material, wherein the thickness of the membrane is greater than 13 microns and wherein the heat conductive sheet in use is in contact with the surface of the sea or other mass of cooling water. (6pp)

Abstract (Equivalent): GB 2145002 B

A still includes a wicking layer adjacent a microporous membrane permeable to water vapour. Sea water is drawn across the wicking layer where it is heated by solar energy to release vapour which passes through the membrane to condense on an impervious sheet underlying the membrane. Periodically distillate is removed and the wicking layer flushed to remove concentrate.

Pref. the microporous membrane is expanded PTFE having a thickness greater than 13 microns and pref. 200-300 microns.

USE/ADVANTAGE - The still floats in sea water to produce drinking water for use on a liferaft. The thickness of the membrane is controlled to establish a preset temp. difference to increase the efficiency of the still. (5pp Dwg.No.0/2)

Title Terms: SOLAR; STILL; MICROPOROUS; MEMBRANE; ADJACENT; WICK; LAYER; LIFERAFT

Derwent Class: A97; D15; Q24

International Patent Class (Additional): B01D-003/00; B01D-013/00; B63J-001/00; C02B-001/08; C02F-001/14

25/7,DE/10 (Item 2 from file: 351)  
DIALOG(R)File 351:Derwent WPI  
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003217210

WPI Acc No: 1981-77768D/198142

Thermally regenerated electrochemical concn. cell - uses low grade regeneration heat source for electricity generation

Patent Assignee: US DEPT ENERGY (USAT )

Inventor: BATES J K; KRUMPELT M

Number of Countries: 001 Number of Patents: 002

Patent Family:

| Patent No  | Kind | Date     | Applicat No | Kind | Date     | Week     |
|------------|------|----------|-------------|------|----------|----------|
| US 4292378 | A    | 19810929 | US 80148326 | A    | 19800509 | 198142 B |
| US 6148326 | N    | 19831122 |             |      |          | 198409   |

Priority Applications (No Type Date): US 80148326 A 19800509

Patent Details:

| Patent No  | Kind | Lan | Pg | Main IPC | Filing Notes |
|------------|------|-----|----|----------|--------------|
| US 4292378 | A    |     | 10 |          |              |

Abstract (Basic): US 4292378 A

An electrochemical cell system comprises two metallic electrodes contacting two electrolytes sepd. by an ion exchange membrane, each composed of different concns. of ionic solvent and a salt having cations of the metallic electrodes. The salt and solvent of one electrolyte form a complex having a free energy of formation less than -5Kcal/mole.

The cell is regenerated by passing the electrolytes through a thermal decomposer which decomposes the complex and forms first and second feeds having high and low concns. of cations, which are recirculated to the respective cell compartments. The decomposer is pref. a solar heated distillation column. Storage chambers are esp. connected to the column to receive prods. from it, and include a supply of materials. Electrolytes are transmitted from the storage chambers to the cell compartments to regenerate the cell when the column is or is not operating.

Process uses low grade heat form solar energy or industrial waste for electricity generation. Efficiency is about 17% if condenser heat is not used, 38% if it is used for e.g. space heating.

Title Terms: THERMAL; REGENERATE; ELECTROCHEMICAL; CONCENTRATE; CELL; LOW; GRADE; REGENERATE; HEAT; SOURCE; ELECTRIC; GENERATE

Derwent Class: L03; X15; X16

International Patent Class (Additional): H01M-006/36; H01M-008/06